2

## What is claimed is:

7	N.	A manager for injection and direct to the state of the first
1	~	A process for injection molding a hollow plastic tubular
2	article comprising th	•
3	(a)	injecting a quantity of plastic material into a mold cavity
4	to at least substan	tially fill said mold cavity, the mold cavity having a
5	substantially cone-sl	haped inlet portion, an elongated central portion and an exit
6	portion;	
7	(b)	injecting pressurized gas into the plastic material in the
8	mold cavity;	
9	(c)	holding the pressure of the gas and plastic in the mold
10	cavity for a predeter	mined amount of time; and
11	(d)	allowing a portion of the plastic material in the mold
12	cavity to be expelle	ed into at least one secondary cavity coupled to the mold
13	cavity.	
1	2.	The process as set forth in claim 1 further comprising the
2	steps of:	
3	(e)	permitting the plastic material to solidify;
4	(f)	exhausting the gas from the mold cavity; and
5	(g)	removing the plastic article from the mold.
1	3.	The process as set forth in claim 1 wherein said cone-
2		an apex and said gas is injected into the plastic material at
3	said apex.	an apex and said gas is injected into the prastic material at
,	said apex.	
1	4.	The process as set forth in claim 1 further comprising the
2	step of holding cor	stant the plastic material injection pressure in the mold
3	cavity for a predeter	mined period of time prior to the injection of gas into the
4	plastic material.	
1	5.	The process as set forth in claim 1 wherein said plastic

material is injected into the mold cavity from an injection molding machine

with a barrel and nozzle, said method further comprising the step of allowing a

- 4 portion of the plastic material in the mold to be expelled back into the barrel of 5 the injection molding machine.
- 1 6. The process as set forth in claim 1 wherein said exit 2 portion comprises a second substantially cone-shaped portion, said cone-shaped 3 exit portion having an apex and said expulsion of plastic material from the mold 4 cavity into the secondary cavity occurs through said apex.
- 7. The process as set forth in claim 1 further calculating the volume of said at least one secondary cavity in order to allow expulsion of a predetermined amount of plastic material from the mold cavity.
- 1 8. The process as set forth in claim 1 wherein the step of 2 allowing a portion of the plastic material in the mold to be expelled comprises 3 opening a valve member in a conduit connecting the mold cavity with the 4 secondary cavity.
- 9. The process as set forth in claim 1 wherein the plastic material is injected into the mold cavity at said cone-shaped inlet portion and enters the mold cavity along the outer surfaces thereof.
- 1 10. The process as set forth in claim 9 further comprising a ring gate mechanism for injecting the plastic material into said cone-shaped inlet portion.
- 1 A process for injection molding a hollow plastic tubular 2 article comprising the steps of:
- 3 (a) injecting a quantity of plastic material to fill or 4 substantially fill a mold cavity, the mold cavity having a first substantially cone-5 shaped inlet portion, an elongated central portion and an exit portion;
- 6 (b) injecting pressurized gas into the plastic material in the 7 mold cavity;
- 8 (c) holding the pressure of the gas and plastic in the mold 9 cavity for a predetermined amount of time;

10	(d) allowing a portion of the plastic material in the mo	olo
11	cavity to be expelled into at least one secondary cavity coupled to the mo	olo
12	cavity;	
13	(e) permitting the plastic material to solidify;	
14	(f) exhausting the gas from the mold cavity;	
15	(g) removing the tubular-shaped plastic article from t	he
16	mold; and	
17	(h) trimming at least one end of the article to form a tubul	la
18	article of substantially constant cross-section.	
1	12. The process as set forth in claim 11 wherein said con	ıe.
2	shaped inlet portion has an apex and said gas is injected into the plastic mater	ia
3	in said apex.	
1	13. The process as set forth in claim 11 further comprising	n٤
2	the step of holding constant the plastic material injection pressure in the mold	
3	cavity for a predetermined period of time prior to the injection of gas into the	
4	plastic material.	
1	14. The process as set forth in claim 11 wherein said plass	tic
2	material is injected into the mold cavity from an injection molding machi-	ne
3	with a barrel and nozzle, said method further comprising the step of allowing	3 2
4	portion of the plastic material in the mold to be expelled back into the barrel	oi
5	the injection molding machine.	
1	15. The process as set forth in claim 11 wherein said ex	xi1
2	portion comprises a substantially cone-shaped portion, said cone-shaped ex	xit
3	portion having an apex and said expulsion of plastic material from the mo	old
4	cavity in the secondary cavity occurs through said apex.	
1	16. The process as set forth in claim 11 further calculating	ng
2	the volume of said at least one secondary cavity in order to allow expulsion of	f a
3	predetermined amount of plastic material from the mold cavity	

1 2

3

4

5

6

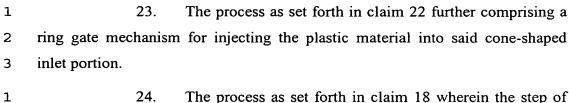
7

1 2

3

L	17. The process as set forth in claim 11 wherein the step of
2	allowing a portion of the plastic material in the mold to be expelled comprises
3	opening a valve member in a conduit connecting the mold cavity with the
Į	secondary cavity.

- A process for injection molding a hollow tubular plastic article utilizing an injection molding machine with a barrel and nozzle and a mold with a mold cavity therein, the mold cavity having a substantially coneshaped inlet portion, an elongated central portion and an exit portion, said method comprising the steps of:
- (a) injecting a quantity of plastic material into said coneshaped inlet portion of the mold cavity from the injection molding machine;
- 8 (b) injecting pressurized gas into the plastic material in the 9 mold cavity; and
- 10 (c) allowing a first portion of the plastic material in the mold 11 cavity to be expelled back into the barrel of the injection molding machine.
  - 1 19. The process as set forth in claim 18 further comprising the step of holding the constant pressure of the gas and plastic material in the mold cavity for a predetermined amount of time before said first portion of the plastic material is expelled back into the injection molding machine.
  - 1 20. The process as set forth in claim 18 wherein a 2 predetermined amount of plastic material is expelled back into the injection 3 molding machine.
  - 1 21. The process as set forth in claim 18 wherein the gas is 2 injected into the plastic material from said exit portion.
    - 22. The process as set forth in claim 18 wherein the plastic material is injected into the mold cavity at said cone-shaped inlet portion and enters the mold cavity along the outer surfaces thereof.



- 24. The process as set forth in claim 18 wherein the step of allowing a first portion of the plastic material in the mold to be expelled back into the barrel of the injection molding machine comprises opening a shut-off valve member positioned between said mold cavity and said barrel.
- 1 25. The process as set forth in claim 24 wherein said valve member is included as part of the nozzle.